

MICRON and MICROSCOPICA ACTA

The international journal of electron microscopy, electron probe microanalysis, optical and electron image processing, and associated equipment and techniques

TITLE SECTION, VOLUME CONTENTS,
AUTHOR AND SUBJECT INDEX

Volume 18, 1987



Pergamon Press

Oxford · New York

Beijing · Frankfurt · São Paulo · Sydney · Tokyo · Toronto

MICRON and MICROSCOPICA ACTA

The international journal of electron microscopy, electron probe microanalysis, optical and electron image processing, and associated equipment and techniques

EDITOR-IN-CHIEF

R. W. Horne, School of Biological Sciences, University of East Anglia, Norwich NR4 7TJ, England
Tel. (0603)-56161, Ext. 2268 or (0603)-505183

ASSOCIATE EDITORS

D. J. H. Cockayne, Electron Microscope Unit, University of Sydney, N.S.W., Australia

V. E. Cosslett, FRS, University of Cambridge, Department of Physics, High Resolution Electron Microscope, Free School Lane, Cambridge CB2 3RQ, England

Sir Peter Hirsch, FRS, Department of Metallurgy and Science of Materials, Oxford University, Parks Road, Oxford OX1 3PH, England

B. Jouffrey, Laboratoire d'Optique Electronique du C.N.R.S., Toulouse cedex, France

K. Kanaya, Department of Electrical Engineering, Kogakuin University, Shinjuku-ku, Nishishinjuku, 1-24-2, Tokyo, Japan

E. Kellenberger, Biozentrum, Basel, Switzerland

N. A. Kiselev, Institute of Crystallography, Academy of Sciences of the U.S.S.R., Leninsky Pr. 59, Moscow 117 333, U.S.S.R.

K. Roberts, John Innes Institute, Colney Lane, Norwich NR4 7UH, England

A. C. Steven, Laboratory of Physical Biology, National Institute of Arthritis, Metabolism and Digestive Diseases, Bethesda, MD 20205, U.S.A.

EDITORIAL BOARD

E. F. J. van Bruggen, Groningen, The Netherlands

S. Bullivant, Auckland, New Zealand

L. M. Clarebrough, Victoria, Australia

J. R. Coleman, Rochester, NY, U.S.A.

J. M. Cowley, FRS, Tempe, AZ, U.S.A.

M. Dym, Boston, MA, U.S.A.

H. Fujita, Osaka, Japan

E. Furubayashi, Ibaraki, Japan

R. M. Glaeser, Berkeley, CA, U.S.A.

T. A. Hall, Cambridge, England

J. R. Harris, Brentwood, England

C. Hawes, Oxford, England

M. A. Hayat, Union, NJ, U.S.A.

J. Heslop-Harrison, FRS, Aberystwyth, Wales

A. Howie, FRS, Cambridge, England

O. Johari, O'Hare, IL, U.S.A.

M. Kessel, Jerusalem, Israel

R. Lagneborg, Stockholm, Sweden

N. J. Lane, Cambridge, England

A. T. Marshall, Bundoora (Melbourne), Australia

T. Mulvey, Birmingham, England

E. A. Munn, Cambridge, England

D. H. Northcote, FRS, Cambridge, England

B. A. Parker, Victoria, Australia

D. W. Pashley, FRS, London, England

H. Ris, Madison, WI, U.S.A.

I. Pasquali Ronchetti, Modena, Italy

P. J. Shaw, Norwich, England

H. G. F. Wilsdorf, Charlottesville, VA, U.S.A.

A. Wolfenden, College Station, TX, U.S.A.

H. Yakowitz, Washington, DC, U.S.A.

Annual Institutional Subscription Rates 1988. DM 600.00, including postage and insurance. Two-year rate (1988-1989) DM 1140.00.

Personal subscription rate for those whose library subscribes at the regular rate: DM 115.00. Subscription enquiries from customers in North America should be sent to: Pergamon Journals Inc., Maxwell House, Fairview Park, Elmsford, NY 10523, U.S.A., and for the remainder of the world to: Pergamon Journals Ltd., Headington Hill Hall, Oxford OX3 0BW, England. Prices are subject to change without notice.

Microform Subscriptions and Back Issues. Back issues of all previously published volumes are available in the regular editions and on microfilm and microfiche. Current subscriptions are available on microfiche simultaneously with the paper edition and on microfilm on completion of the annual index at the end of the subscription year.

Published quarterly.

Copyright © 1988 Pergamon Journals Limited

It is a condition of publication that manuscripts submitted to this journal have not been published and will not be simultaneously submitted or published elsewhere. By submitting a manuscript, the authors agree that the copyright for their article is transferred to the publisher if and when the article is accepted for publication. However, assignment of copyright is not required from authors who work for organizations which do not permit such assignment. The copyright covers the exclusive rights to reproduce and distribute the article, including reprints, photographic reproductions, microform or any other reproductions of similar nature and translations. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, electrostatic, magnetic tape, mechanical, photocopying, recording or otherwise, without permission in writing from the copyright holder.

Photocopying information for users in the U.S.A. The Item-fee Code for this publication indicates that authorization to photocopy items for internal or personal use is granted by the copyright holder for libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service provided the stated fee for copying beyond that permitted by Section 107 or 108 of the United States Copyright Law is paid. The appropriate remittance of \$3.00 per copy per article is paid directly to the Copyright Clearance Center Inc., 27 Congress Street, Salem, MA 01970.

Permission for other use. The copyright owner's consent does not extend to copying for general distribution, for promotion, for creating new works, or for resale. Specific written permission must be obtained from the publisher for such copying.

The Item-fee Code for this publication is: 0739-6260/87 \$3.00 + 0.00

CONTENTS OF VOLUME 18

Number 1

BIOLOGICAL APPLICATIONS

B. WOLF, C. LEZIUS and
A. SCHWINDE

- 1 New devices and results for diagnostic histopathological transmission electron microscopy on large ultrathin cryosections from human tumours

J. R. HARRIS

- 11 α -Mannosidase from jack bean (*Canavalia ensiformis*): negative staining of single molecules and paracrystalline forms

MICROANALYSIS

A. T. MARSHALL and
R. J. CONDRON

- 23 A simple method of using $\phi(\rho z)$ curves for the X-ray microanalysis of frozen-hydrated bulk biological samples

Short communications

M. H. WILLIAMS, M. VESK and
M. G. MULLINS

- 27 Tissue preparation for scanning electron microscopy of fruit surfaces: comparison of fresh and cryo-preserved specimens and replicas of banana peel

P. HUTZSCHENREUTER and
H. MOLLE

- 33 Digital evaluation of compacta cross-section preparations

Conference Report

- 37 R body round table
- 41 Book Reviews: *Basic Techniques for Transmission Electron Microscopy*, by M. A. Hayat, reviewed by J. S. Hanker and B. L. Giammara
Low Temperature Methods in Biological Electron Microscopy, by A. W. Robards and U. B. Sleytr, reviewed by M. V. Nermut
- 43 New Patents
- 51 Diary
- 53 Conference Announcements
- I Instructions to Authors

Number 2

BIOLOGICAL APPLICATIONS

M. TZAPHLIDOU

- 55 Collagen cross-linking produced by dimethyladipimide. Its comparison with dimethylsuberimide

Contents

- F. GITTES and R. P. BOLENDER 59 Counting cell nuclei with random sections: the effect of shape and size

- I. GIBSON, G. BEDINGFIELD, H. DOBBS and J. SHACKLETON 71 Effects of various agents on the R bodies of certain bacteria

SCANNING MICROSCOPY

- D. K. HAMILTON and T. WILSON 77 Infrared sub-band-gap photocurrent imaging in the scanning optical microscope of defects in semiconductor devices

SCANNING MICROSCOPY: BIOLOGICAL APPLICATIONS

- D. W. EVELING 81 Scanning electron microscopy of plant surfaces using low temperature dehydration prior to critical point drying

METALLURGICAL AND MATERIAL SCIENCE

- W. BENSCH and R. SCHLÖGL 89 Characterization of transition metal substituted vanadium chalcogenides with SEM and EDA

MINERALOGICAL APPLICATIONS

- A. J. EASTON, D. CLAUGHER and V. F. BUCHWALD 101 Plessites and associated structures in the Cape York iron meteorite revealed by chlorine corrosion

107 New Patents

117 Diary

119 Conference Announcements

I Instructions to Authors

Number 3

BIOLOGICAL APPLICATIONS

- B. WOLF, R. NEHER and A. SCHWINDE 121 Development and new design of a semiautomatic cryo-ultramicrotome for histopathological transmission electron microscopy on large ultrathin cryosections: description of a prototype

- K. KANAYA, N. BABA, M. NAKA and H. MORI 131 The digital structural analysis of helical Hirano bodies obtained by electron microscopy

- M. TZAPHLIDOU and J. A. CHAPMAN 147 A study of staining for electron microscopy using collagen as a model system—VI. Uranyl nitrate negative staining patterns and their correlation with sequence data

Contents

F. R. POND, J. A. BURBACH and B. WELLS	153	Relationships among the R bodies of caedibacteria
 MICROANALYSIS		
A. G. POGORELOV	159	Quantitation procedure for calculating the sensitivity of X-ray microanalysis of biological thin sections
 SCANNING/TRANSMISSION ELECTRON MICROSCOPY		
M. PAN, J. M. COWLEY and R. GARCIA	165	STEM and microdiffraction studies of Rh/CeO ₂
 METALLURGICAL AND MATERIAL SCIENCE APPLICATIONS		
L.-M. PENG and J. M. COWLEY	171	Diffraction contrast in reflection electron microscopy—I. Screw dislocation
L.-M. PENG, J. M. COWLEY and T. HSU	179	Diffraction contrast in reflection electron microscopy—II. Surface steps and dislocations under the surface
 <i>Short Communication</i>		
B. BIRD and I. GIBSON	187	Studies on R-bodies of <i>Pseudomonas avenae</i>
 ABSTRACTS OF THE ANNUAL MEETING OF THE BELGIAN SOCIETY OF ELECTRON MICROSCOPY, 1987		
R. B. DE ZANGER, M. NYSEN and E. WISSE	195	Acquisition and processing of TV and high resolution slow scan SEM images
A. M. G. L. DE MAZIÈRE, D. W. SCHEUERMANN and P. A. P. M. AERTGEERTS	197	Complementarity of particles and pits in freeze-fractured gap junctions of hepatocytes and cardiac muscle cells
PH. COMPERE, A. J. MORGAN, C. WINTERS and G. GOFFINET	199	Calcium and magnesium localization, as determined by the K ⁺ pyroantimonate method and X-ray microanalysis in the shore crab cuticle during a molting cycle
A. GEERTS, D. SCHUPPAN, E. HAHN, P. VAN DER SPEK, P. SCHELLINK, R. DE ZANGER, A. DE WILDE and E. WISSE	201	Immunocytochemical and morphometric analysis of the striated interstitial collagen fibrils in the space of Disse of rat and human liver
D. NONCLERCQ, G. TOUBEAU, G. LAURENT, P. MALDAGUE, P. M. TULKENS et J. A. HEUSON-STIENNON	203	Etude morphologique des cellules en prolifération dans le cortex rénal de rat traité à la tobramycine

Contents

M. THIRY	205	Ultrastructural and cytochemical study of nucleoli of Ehrlich tumour cell using a RNase-gold complex
J. QUATACKER	207	Counterstaining of post-embedding lectin-gold labeled glycolmethacrylate sections with phosphotungstic acid at low pH
K. ROLAND, M. P. DUFIEF, R. SHERIDAN et J. A. HEUSON	209	Apport de la microscopie électronique à l'étude de l'interface OS-implant
B. HERBERT, A. LECOUTURIER, N. HAUSER, D. MASQUELIER and C. REMACLE	211	Ultrastructural localization of alkaline phosphatase in osteogenic cultures
F. VANDERSTRAETEN-GREGOIRE, M. STEVENS and C. REMACLE	213	Ultrastructural analysis of the preadipocytes differentiating in culture
M. M. PRAET and H. J. ROELS	215	An ultrastructural study of oval cells in thioacetamide (TAA) induced liver carcinogenesis in rats
H. VAN BOSSUYT and E. WISSE	217	Rat Kupffer cell ultrastructure after a single endotoxin injection
J. R. BOTELLA MESA and J.-P. VERBELEN	219	Immunocytochemical localization of glutamine synthetase in leaves of tomato seedlings
W. A. JACOB and P. DOCKX	221	Cytochemical demonstration of mediator calcium in urticaria
R. C. HERTSENS and W. A. JACOB	223	Dynamic behaviour of native matrix granules in heart mitochondria
L. LEURENTOP, F. J. FLORENCIO and J.-P. VERBELEN	225	The molecular structure of glutamine synthetase from <i>Anacystis nidulans</i> as studied by electron microscopy
P. J. GOVAERTS, I. I. BERNAERT, M. V. L. DU CAJU and W. A. JACOB	227	Sandwich embedding and perpendicular sectioning of monolayers
J. LAMBERT, R. HERTSENS, J. DUMON and P. DOCKX	229	Deformities over the long axis of the hair in a premature ageing syndrome
D. W. SCHEUERMANN	231	Electron microscopic-cytochemical and X-ray microanalytical study on lysosomes in lymphocytes of the rat
A. M. G. L. DE MAZIÈRE and D. W. SCHEUERMANN	233	Morphometric analysis of gap junctions in the rat liver parenchyma as modulated by administration of dibutyryl cAMP and aminophylline
C. FANIDIS, D. VAN DYCK, W. COENE and J. VAN LANDUYT	235	The influence of thermal atom motion on high resolution images

Contents

PH. MOREAU, W. COENE, D. VAN DYCK and J. VAN LANDUYT	237	Incoherent effects due to beam convergence in high resolution electron microscopy
D. BRODDIN, M. DE GRAEF, G. VAN TENDELOO, J. VAN LANDUYT, L. DELAEY and S. AMELINCKX	239	Long period superstructures in Cu-Al
J. LECOMTE-BECKERS and G. WALMAG	241	Microstructural study of high strength rolled Zn-Cu-Ti alloys
F. DELANNAY, S. DERKAOUI and C. H. ALLIBERT	243	Transmission electron microscopy of Sm (CoFeCuZr) _{7.2} alloys for permanent magnet
S. KUYPERS, G. VAN TENDELOO, J. VAN LANDUYT and S. AMELINCKX	245	Electron microscopic study of the homologous series of mixed layer compounds (As ₂ Te ₃)(GeTe) _n
A. DE VEIRMAN, K. YALLUP, J. VAN LANDUYT, H. E. MAES and S. AMELINCKX	247	TEM study of silicon on insulator structures obtained by oxygen ion implantation
F. MICHIELS, W. VANHOOLST, W. JACOB, P. VAN ESPEN and F. ADAMS	249	Applications of image processing for surface characterization and depth profiling with SIMS
	251	New Patents
	255	Book Review: <i>Advanced Techniques in Biological Electron Microscopy III</i> , edited by J. K. Koehler, reviewed by P. W. Hawkes
	257	Diary
	258	Conference Announcements
	I	Instructions to Authors

Number 4

BIOLOGICAL APPLICATIONS

P. WILD, G. BERTONI, E. M. SCHRANER and R. BEGLINGER	259	Influence of calcium and magnesium containing fixatives of the ultrastructure of parathyroids
D. P. MATTHOPOULOS and M. TZAPHLIDOU	273	Tissue culture fixation with diimidoesters—I. Comparison of structure obtained with diimidoesters and formaldehyde
Y.-S. LEE	281	High resolution electron microscope lattice images of powdered gallstones

Contents

- I. GIBSON, G. WILLIS, B. WELLS
and G. BEDINGFIELD 291 Comparative studies on the R-bodies of certain
bacteria

PAPERS FROM THE ROYAL MICROSCOPICAL SOCIETY MEETING 'ELECTRON MICROSCOPY OF VIRUSES—STATE OF THE ART'

- 297 Editorial Note
- J. E. BEESLEY and M. P. BETTS 299 Colloidal gold probes for the identification of virus
particles: an appraisal
- M. E. C. REY 307 Immunocytochemical investigation of the causal agent
of cassava mosaic disease in Southern Africa
- A. KARPAS, W. GILLSON
and Y. NAGAI 317 A human leukaemic cell line producing a new retro-
virus
- B. V. VENKATARAM PRASAD,
G. J. WANG, J. P. M. CLERX
and W. CHIU 327 Cryo electron microscopy of spherical viruses: an
application to rotaviruses

333 Abstracts

NEW APPARATUS AND METHODS

- 337 Swedish image processing method for microscopy
gives higher capacity at reduced cost
- 339 New Patents
- 347 Conference Announcement
- I Instructions to Authors

